



RAWALPINDI MEDICAL UNIVERSITY RAWALPINDI
DEPARTMENT OF PHYSIOLOGY

Curriculum of Learning Management System
First & Second Year MBBS 2025



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The Vision

The Learning Management System (LMS) for books is designed to create a seamless and efficient learning environment that prioritizes essential concepts while providing balanced coverage of less critical topics. The LMS aims to prepare students effectively for upcoming examinations by offering structured and focused content.



Benefits of the LMS:

1. Continuous Connectivity:

The LMS ensures that students remain engaged with their studies and maintain communication with the department, even during unforeseen disruptions, such as road blockages or other uncertainties.

2. Comprehensive Coverage:

It provides a platform for students to address less critical topics at their own pace, ensuring a well-rounded understanding of the subject matter.

3. Time Efficiency:

By streamlining the teaching and learning process, the LMS saves time for both faculty and students, allowing for more productive and focused educational experiences.

4. Dynamic Improvements:

Regular updates by the IT department will address flaws and enhance the system's functionality, ensuring it meets the evolving needs of users.

5. Accessibility:

Students must have proper internet connectivity at home to maximize the benefits of the LMS, enabling uninterrupted access to educational resources.

This LMS will serve as a bridge between traditional teaching methods and modern digital learning, fostering a robust and adaptive educational ecosystem.

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Introduction:

A **Learning Management System (LMS)** is a software application or platform used to deliver, manage, and track educational content and training programs. It helps organizations, institutions, or businesses deliver learning experiences to learners in an organized, scalable, and accessible way.

1. Course Creation & Management:

- Allows instructors or administrators to create and organize courses, modules, lessons, and assessments.
- Supports multimedia content such as videos, quizzes, PDFs, and presentations.

2. User Management:

- Facilitates the creation of user profiles for learners, instructors, and administrators.
- Allows tracking of individual progress, achievements, and performance.

3. Assessment & Testing:

- Includes features for creating and administering quizzes, assignments, and exams.
- Provides automated grading and feedback to learners.

4. Reporting & Analytics:

- Tracks learner performance, course completion rates, and engagement levels.
- Provides insights to instructors and administrators for informed decision-making.

5. Communication Tools:

- Integrates discussion boards, chat features, and email to facilitate communication between learners and instructors.
- Supports notifications and announcements.

6. Scalability & Flexibility:

- Can accommodate a growing number of learners or users.
- Supports a variety of learning styles, including synchronous (live) and asynchronous (self-paced) learning.

7. Mobile Access:

- Many LMS platforms are mobile-friendly or offer mobile apps to support learning on the go.

Implementation of LMS:

To ensure the effective implementation of the Learning Management System (LMS), the following steps will be undertaken:

1. **Infrastructure Setup:**

The LMS will be hosted on a well-equipped platform capable of handling multiple users simultaneously, ensuring reliability and performance during peak usage times.

2. **IT Department Support:**

A dedicated IT department will be responsible for managing the system, providing technical support, and ensuring smooth operation.

3. **User Credentials:**

Unique IDs and passwords will be issued to each student by the IT department, granting secure access to the LMS. Students will be guided on how to use the platform effectively.

4. **Exam Scheduling:**

Dates and times for exams will be pre-set within the LMS, allowing students to prepare accordingly. The scheduling system will ensure timely availability of test materials and instructions.

5. **Automated Notifications:**

Automated messages will be sent to students to inform them of upcoming exams, deadlines, or important updates. These notifications will ensure students remain informed and prepared.

6. **Test Notices:**

Detailed test notices, including exam guidelines, formats, and schedules, will be shared with students through the LMS to ensure clarity and readiness.

This structured implementation plan will enable the LMS to function effectively, fostering a productive and organized learning environment for both students and faculty.

TOS for LMS Department of Physiology:

Two types of exams are conducted.

1. Formative
2. Summative

During module exam, minimum 2 ONLINE formative assessments are conducted in the evening.

At the end of block, a On Campus Summative assessment is conducted, comprises of component of both modules.

Single best answer with Scenario based Questions

Table 1: Frequency of Formative & Summative Assessments & Distribution of MCQs in LMS:

Sr. #.	Nomenclature of Exam			Type of Assessment	No of MCQs
1.	Mid Module	LMS Test 1	After 1 Week of Module	Formative	15
2.	End of Module	LMS Test 2	After 3 Week of Module	Formative	15
3.	Block	LMS Test 3	After Completion of 2 Modules	Summative	30

Table 2: Distribution of Questions According to Level of Cognition:

Sr.#	Level of Cognition	%age Distribution of Questions	Type of Integration
1.	C1(Recall)	20%	Horizontal
2.	C2(Interpretation)	60%	Core Concept & Vertical
3.	C3(Problem Solving)	20%	Vertical(Purely Clinical Concepts)

Table 3: Implementation of Calgary Model of Categorization of Questions for LMS assessments:

Sr. No	Type of Assessment	Calgary Model		
		Must Know (A)(A)	Should know (B)(B)	Nice to know (C)(C)
1.	Formative	50%		50%
2.	Summative	100%		-----

Module wise Learning Objectives:

First Year MBBS:

1. Foundation Module:

Sr. #	Topics	Learning Objectives	Calgary Model	Mode of Assessment	Tool of Assessment
1.	Concept of body fluids & internal environment.	• Introduction • Concept of extracellular and intracellular fluid • Homeostasis • Examples of control system	Must Know (A) (A)	LGIS&SDL	MCQs
2.	Cell membrane & classification of cell organelles	• Structure of cell membrane • Cell cytoskeleton • Cytoplasm and various organelles • Golgi Apparatus and its function • Lysosomes and peroxisomes • Secretory vesicles	Must Know (A) (A)	LGIS&	MCQs
3.	Intracellular communication and cell junction	• Receptors and its types • Cellular signaling and various mechanisms • Signal transduction • Hormone receptors and their activation • Second messenger mechanisms	Nice to know (C)	LGIS&	MCQs
4.	Receptors and signal transduction	• Receptors and its types • Cellular signaling and various mechanisms • Signal transduction • Hormone receptors and their activation • Second messenger mechanisms	Nice to know (C)	LGIS&	MCQs
5.	Homeostasis Control System-I(Negative Feedback System, Concept of Error and Gain)	• Control systems of body • Negative and positive feedback mechanism and their examples • Apoptosis and necrosis	Must Know (A)	LGIS&	MCQs
6.	Genetics, Transcription and Translation	• Building blocks of DNA • Genetic code • Process of transcription and translation • Types of RNA • Cell division	Must Know (A)	LGIS&	MCQs

7.	Structure of Nucleus, Ribosomes and Cell Division	• Structure of Nucleus • Ribosomes • Mitosis & Overview of cancer	Must Know (A)	LGIS&	MCQs
8.	Transport across cell membrane and its various types (osmosis, diffusion, primary and secondary active transport)	• Types of transport across cell membrane • Diffusion and osmosis • Concept of gating of channels • Primary active transport • Secondary active transport	Must Know (A) / Should know (B)	LGIS&	MCQs

2. MSK 1 MODULE

Sr. #	Topics	Learning Objectives	Calgary Model	Mode of Assessment	Tool of Assessment
1.	Structure of neurons Classification of neurons & nerve fibers	• Structure of neurons • Myelinated and unmyelinated nerve fibers. • Neuroglia • Difference between neurons and glial cells	Nice to know (C)	SDL	MCQs
2.	Nernst potential, RMP	• Basic physics of membrane potential, Nernst equation, • Goldman Equation • Origin of RMP in different cell types.	Must Know (A)	LGIS&SDL	MCQs
3.	Properties of nerve fibers	• Rhythmicity of Excitable tissues, • Characteristics of signal transmission, • Types of refractory period • Concept of excitation	Nice to know (C)	SDL	MCQs
4.	Measurement of RMP & effect of electrolytes on RMP	• Measurement of RMP • Effect of electrolytes on RMP • Role of Na/K pump	Must Know (A)	LGIS&SDL	MCQs
5.	Concept of degeneration & regeneration	• Introduction • Axonal Degeneration • Wallerian Degeneration	Nice to know (C)	SDL	MCQs
6.	Stimulus & response & types of stimuli, Stages of action potential	• Neuron action potential, • Stages of Propagation of AP • Conduction Rates • ALL-OR-NONE Principle	Nice to know (C)	SDL	MCQs

7.	A, Refractory period, types of action potential. Graded potential comparison with action potential B. Recording & propagation of action potential & factors effecting nerve conduction & hyperpolarized state	• Threshold Potential • Action potential • Types of Action Potential • Propagation of Action Potential • Hyperpolarization • Factors effecting Action potential	Must Know (A)	LGIS&SDL	MCQs
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3. MSK II MODULE

Sr. #	Topics	Learning Objectives	Calgary Model	Mode of Assessment	Tool of Assessment
1.	Introduction to muscle physiology, Structure of sarcomere	• Explain the physiologic anatomy of skeletal muscle • Draw and label the sarcomere	Nice to know (C)	SDL	MCQs
2.	Sarcotubular system, excitation contraction coupling mechanism in skeletal muscle	• Discuss the sliding filament model of muscle contraction • Describe the structure sarcotubular system and its importance in muscle contraction	Must Know (A)	LGIS&SDL	MCQs
3.	Molecular Mechanism of skeletal muscle contraction, Rigor mortis, Muscular dystrophies	• Define motor unit • Discuss recruitment and its effect on force of contraction • Discuss Molecular Mechanism of skeletal muscle contraction	Must Know (A)	LGIS&SDL	MCQs
4.	Length tension curve, Load and velocity of contraction, diseases of muscle	• Draw and describe Length duration curve Load and velocity of contraction	Nice to know (C)	SDL	MCQs
5.	Energetics, efficiency and types of contraction, heat production in muscle	• Elaborate Energetic and efficiency of contraction. • Discuss heat production in nerve and muscle	Nice to know (C)	SDL	MCQs
6.	Properties of skeletal muscles, Tetanus & Fatigue	• Discuss various properties of skeletal muscle in detail • Tetanus and fatigue	Must Know (A)/ Should know (B)	LGIS&SDL	MCQs

7.	Introduction to CVS	• Introduction to Cardiovascular system. Classify blood vessels	Nice to know (C)	SDL	MCQs
8.	Physiologic anatomy, types and properties of Smooth Muscle	• Enlist type of smooth muscles and explain their characteristics • Explain the properties of smooth muscle	Nice to know (C)	SDL	MCQs
9.	Introduction to pericardium Properties of myocardium & endocardium, myocardial action potential	• Describe the physiologic anatomy of myocardium • Discuss properties of myocardium • Discuss in detail various properties of myocardium • Describe the mechanism of production of action potential and its propagation • Describe excitation contraction coupling in detail • Discuss propagation of electrical activity in cardiac muscle	Must Know (A)/ Should know (B)	LGIS&SDL	MCQs

4. BLOOD MODULE

Sr. #	Topics	Learning Objectives	Calgary Model	Mode of Assessment	Tool of Assessment
1.	Composition of blood	• Describe composition and general functions of blood • Explain the role of bone marrow in hemopoiesis and erythropoiesis • Draw steps of hemopoiesis • Define committed and uncommitted cells	Must Know (A)/ Should know (B)	LGIS &SDL	MCQs
2.	Function of Plasma Proteins	• Enumerate plasma proteins, their properties, sites of productions and their functions • Explain effects of deficiency of plasma proteins • Discuss conditions associated with decreased production	Nice to know (C)	SDL	MCQs

		and increased excretion of plasma proteins			
3.	WBCs classification & formation. Neutrophils, Eosinophils & Basophils and their properties	- Enumerate and explain various types of leukocytes and steps of leucopoiesis - Explain the characteristics and functions - Conditions in which these cells are increased and decreased - Leukemias and their effects on the body	Must Know (A)/ Should know (B)	LGIS&SDL	MCQs
4.	Monocytes - macrophage system & lymphocytes	- Explain the characteristics and functions of monocytes. - Explain monocyte-macrophage system; importance	Must Know (A)	LGIS&SDL	MCQs
5.	Process of inflammation and Lines of defense during inflammation	- Describe the role of neutrophils and monocytes in inflammation - Elaborate Lines of defense	Must Know (A)	LGIS&SDL	MCQs
6.	Red cell fragility, ESR & Red cell indices, Anemia & polycythemia	- Define RBC fragility; importance; conditions in which fragility is changed. - Discuss various blood indices, - give their formulae, co-relate with different types of anemias. - Enumerate various types of anemias and polycythemias. - Discuss details about various types of anemias and polycythemia and their effect on circulatory system.	Must Know (A)	LGIS&SDL	MCQs
7.	Blood coagulation	Explain hemostasis, mechanism of blood coagulation, fibrinolysis and anticoagulants	Must Know (A)	LGIS&SDL	MCQs

8.	ABO & Rh Blood grouping system	- Blood group and its types - Rh Blood Grouping System	Must Know (A)	LGIS&SDL	MCQs
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5. CVS MODULE

Sr. #	Topics	Learning Objectives	Calgary Model	Mode of Assessment	Tool of Assessment
1.	Introduction to CVS	Describe scheme of circulation through the heart and body	Nice to know (C)	SDL	MCQs
2.	Classification of blood vessels & Biophysical considerations	- Enumerate Classification of blood vessels. - Explain structure and functions of types of blood vessels	Nice to know (C)	SDL	MCQs
3.	Heart Sounds	Describe four heart sound and differences between 1st and 2nd heart sounds	Must Know (A)	LGIS&SDL	MCQs
4.	Regulation of blood flow	- Define and describe Resistance to Blood flow - Describe regulation of Blood pressure and Poiseuilles law - Describe factors related with Blood viscosity and its role in regulation	Must Know (A)	LGIS&SDL	MCQs
5.	Capillary circulation, Concept of vasomotion and starling forces	- Explain the details of types of starling forces - Explain role of starling forces in different pathological conditions	Must Know (A)	LGIS&SDL	MCQs
6.	Functions of veins, Venous return and factors affecting venous return	- Describe how veins are different from arteries - Explain Various factors that affect venous return	Must Know (A)/ Should know (B)	LGIS&SDL	MCQs
7.	Introduction to ECG & its clinical importance	- Enumerate and describe normal components of ECG - Draw normal ECG - Describe the method of recording ECG - Describe the following. Bipolar limb leads. - Describe Einthovians law and Enthovian triangle. - Describe Chest leads and Augmented	Nice to know (C)	SDL	MCQs

		- unipolar limb leads - Describe how to read normal ECG - Describe the principles of vectorial analysis of ECG. - Describe the vectorial analysis of normal ECG			
8.	Cardiac output & its control, measurement of cardiac output, pathologically high and low cardiac output	- Explain cardiac output - Understand various method to measure cardiac output - Explain various factor which help in regulation of heart rate and stroke volume	Must Know (A)/ Should know (B)	LGIS&SDL	MCQs

6. Respiratory Module

Sr. #	Topics	Learning Objectives	Calgary Model	Mode of Assessment	Tool of Assessment
1.	Mechanics of pulmonary ventilation, Lung compliance	- Enumerate muscles of inspiration and expiration and - Describe mechanics of pulmonary ventilation - Describe surfactant, surface tension and collapse of alveoli - Define compliance. - Draw compliance diagram of lungs. - Explain relationship of surface tension, radius of alveoli ,elastic forces of lungs with compliance	Must know	LGIS &SDL	MCQs
2.	Pulmonary circulation & Pulmonary capillary dynamics. Physical principles of gas exchange	- Discuss the role of alveoli and pleural space in respiration and pressure changes during respiration - Enlist non-respiratory and respiratory functions of respiration - Define and explain the concept of respiratory membrane. - Define and draw respiratory unit - Draw a diagram showing the exchange of gases through the respiratory membrane	Must Know (A)/ Should know (B)	LGIS&SDL	MCQs

3.	Diffusion through respiratory membrane	• Enlist four factors affecting the rate of gas diffusion through the respiratory membrane • Define diffusing capacity of respiratory membrane. • Describe the diffusing capacity for oxygen. • Describe the diffusing capacity for carbon dioxide. • Describe the changes in diffusing capacity of oxygen and carbon dioxide during exercise • Compare the diffusing capacities of oxygen and carbon dioxide	Must Know (A)	LGIS&SDL	MCQs
4.	Pulmonary volumes, capacities & functions of respiratory tract	• Define lung volumes and capacities. • Define the four pulmonary volumes and capacities. • Enlist normal values of all the lung volumes and capacities • Draw a graph representing all the lung volumes and capacities. • Describe how lung volumes and capacities can be measured with spirometer. • Enlist the lung volumes and capacities which can't be measured by spirometer	Must Know (A)	LGIS&SDL	MCQs

1. GIT Module:

Sr. #	Topics	Learning Objectives	Calgary Model	Mode of Assessment	Tool of Assessment
1.	Introduction to GIT, electrical activity in GIT, Enteric Nervous System and GIT reflexes	• Introduction • Role of GIT in homeostasis • Concept of Enteric nervous system • GIT reflexes and its clinical correlation	Must Know (A)/ Should know (B)	LGIS &SDL	MCQs
2.	Small intestine motility and malabsorption (sprue, paralytic ileus and Crohn's disease)	• Factors affecting motility of small intestine • Concept of absorption of nutrients • Importance of history in diagnosis of various malabsorption diseases • Inflammatory bowel disease	Must Know (A)/ Should know (B)	LGIS&SDL	MCQs
3.	Saliva and mastication, stages of swallowing, clinical disorders of esophagus and swallowing, achalasia and vomiting	• Basic concept of swallowing and its stages. • Disorders related to esophagus. • Clinical correlation of achalasia, GERD.	Must Know (A)/ Should know (B)	LGIS&SDL	MCQs
4.	Movements of GIT, control of GIT motility and factors affecting GIT blood flow, hormones of GIT	• GIT motility, Factors affecting motility • GIT blood flow • Hormones related to GIT. • Hormonal control of GIT.	Must Know (A)/ Should know (B)	LGIS&SDL	MCQs
5.	Motor functions of stomach, physiology of regulation of gastric emptying	• Motor functions of stomach. • Gastric emptying • Clinical correlation with Gastric emptying • Diabetes and its association with gastric emptying.	Must Know (A)	LGIS&SDL	MCQs
6.	Physiology of liver and gall bladder, liver and biliary secretion	• Anatomy of liver and gall bladder • Role of liver and biliary secretions	Nice to know (C)	SDL	MCQs

		indigestion. • Diseases related with biliary secretion • Pancreatitis			
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2. Renal module:

Sr. #	Topics	Learning Objectives	Calgary Model	Mode of Assessment	Tool of Assessment
1.	Body fluid compartments, Volume & osmolarity of ECF & ICF.	• Fluid Intake/Output balance • Body fluid compartments • Constituents of ECF & ICF • Concept of Osmolarity, Osmolality, Osmosis and Osmotic pressure	Nice to know (C)	SDL	MCQs
2.	Physiology of Renal system, Glomerular filtration rate	• Functions of kidney. • Physiologic Anatomy of Kidney • Concept of Glomerular Filtration • Introduction to Glomerular filtration rate.	Must Know (A)/ Should know (B)	LGIS&SDL	MCQs
3.	Abnormalities of fluid volume & regulation, Edema	• Volume and osmolarity in abnormal states • Abnormalities of fluid volume & Regulation • Hyponatremia and Hypernatremia • Edema and its Mechanism. • Fluid in potential spaces of the body	Should know (B)	LGIS&SDL	MCQs
4.	Regulation of GFR & RBF-I (Determinants of GFR & RBF)	• Glomerular filtration rate & Renal Blood flow • Determinants of GFR • Determinants of RBF	Must Know (A)/ Should know (B)	LGIS&SDL	MCQs
5.	Excretion of dilute urine	• Mechanism of Excretion of Excess water through Dilute Urine. • Role of ADH (Anti-Diuretic Hormone) • Renal mechanism for excreting dilute urine.	Must Know (A)/ Should know (B)	LGIS&SDL	MCQs
6.	Regulation of GFR & RBF-II, Physiological	• Physiological control of GFR and RBF. • Auto regulation of GFR and RBF.	Must Know (A)/ Should know (B)	LGIS&SDL	MCQs

	control of GFR and RBF, Auto regulation of GFR and RBF/Macula densa feedback mechanism	• Tubulo-glomerular Feedback Mechanism • Macula-densa Feedback Mechanism			
7.	Excretion of concentrated urine (Counter current multiplier)	• Concentrated urine and Conservation of water. • Counter-current multiplier and counter current exchanger mechanism. • Osmoreceptor-ADH feedback mechanism • Specific gravity of urine and Importance of thirst.	Must Know (A)	LGIS&SDL	MCQs
8.	Tubular reabsorption & secretion along various parts of nephrons	• Tubular reabsorption & secretion in Proximal tubule • Loop of Henle • Distal tubule & collecting tubule. • Active and passive transport mechanisms	Must Know (A)/ Should know (B)	LGIS&SDL	MCQs

3. Reproduction Module:

Sr. #	TOPICS	LEARNING OBJECTIVES	Calgary Model	Mode of Assessment	Tool of Assessment
1.	Physiological anatomy of male reproductive system & spermatogenesis	• Physiological anatomy of male sexual organs • Spermatogenesis and its steps • Hormonal Factors that stimulate spermatogenesis	Nice to know (C)	SDL	MCQs
2.	Physiological anatomy female reproductive system	• Physiological anatomy of female sex organs • Oogenesis and follicular development in the ovaries • Female hormonal system	Nice to know (C)	SDL	MCQs
3.	Semen, capacitation & acrosome reaction	• Semen and its components • Capacitation and its role in Fertilization • Acrosome reaction	Must Know (A)	LGIS&SDL	MCQs

		and Penetration of the Ovum			
4.	Monthly Ovarian Cycle, ovulation	- Monthly Ovarian Cycle - Function of Gonadotropic Hormones - Three phases of Ovarian cycle (Follicular, Ovulation and luteal phase)	Must Know (A)	LGIS&SDL	MCQs
5.	Male sex hormones, Abnormalities of male sexual function and spermatogenesis	- Testosterone and other male sex hormones - Function of Testosterone - Role of Hypothalamus and anterior pituitary gland	Must Know (A)/ Should know (B)	LGIS&SDL	MCQs
6.	Monthly Endometrial Cycle and Menstruation	- Monthly Endometrial Cycle - Menstruation - Phases of Menstrual cycle (Proliferative, Secretory and Menstrual phase)	Must Know (A)/ Should know (B)	LGIS&SDL	MCQs
7.	Response of mother's body to pregnancy, Parturition	- Maturation and Fertilization of Ovum - Anatomy and function of placenta - Hormonal Factors in Pregnancy - Parturition - Hormonal and Mechanical factors in Parturition	Must Know (A)/ Should know (B)	LGIS&SDL	MCQs
8.	Female sex hormones (oestrogen and progesterone)	- Functions of Ovarian Hormones - Estradiol and Progesterone - Effects of primary and secondary female sex characteristics	Must Know (A)/ Should know (B)	LGIS&SDL	MCQs

4. CNS Module:

Sr. #	Topics	Learning Objectives	Calgary Model	Mode of Assessment	Tool of Assessment
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1.	Organization of nervous system, Mechanism of synaptic transmission	- Describe the general organization of nervous system - Describe major levels of CNS functions - Briefly explain nerve fiber structure, classification & properties - Describe labeled line principle - Define synapse - Enumerate & compare types of synapses - Describe process of synaptic transmission - Enumerate the important neurotransmitters of nervous system	Should know (B)	LGIS&SDL	MCQs
2.	Classification of sensory receptors, Properties of sensory receptors	- Enumerate & explain different types of sensory receptors according to function - Enumerate & explain different types of sensory receptors according to location - Enlist various properties of sensory receptors - Describe mechanism of signal transduction & generation of receptor potential - Describe mechanism of adaptation of different types of receptors - Describe the properties of sensory receptors - Describe the types and characteristics	Should know (B)	LGIS&SDL	MCQs

		of tactile receptors			
3.	Properties of synaptic transmission	- Briefly explain the electrical events during neuronal excitation and inhibition - Explain temporal and spatial summation - Enlist & explain various characteristics of synaptic transmission	Nice to know (C)	SDL	MCQs
4.	Physiology of pain, Dual pathway for transmission of pain, Analgesia System and Thermal sensations	- Define pain - Enumerate different types of pain - Tabulate the differences between two types of pain - Describe characteristics of pain receptors - Discuss the mechanism of stimulation of pain receptors - Compare and contrast neospinothalamic & paleospinothalamic tract - Define referred pain - Explain the mechanism of referred pain - Give examples of referred pain - Describe visceral pain and its causes - Define headache - Enlist the types of headache & their causes	Nice to know (C)	SDL	MCQs

		• Explain the analgesia system • Describe thermal receptors • Explain mechanism of excitation of thermal receptors • Describe transmission of thermal signals in nervous system			
5.	Sensory pathways for transmitting somatic signals	• Classify somatic senses • Describe the sensory pathways for transmission of somatic sensations to central nervous system. • Enumerate sensations carried by dorsal column system and anterolateral system • Describe the characteristics of transmission in the dorsal column medial lemniscal system and anterolateral system • Compare and contrast dorsal column medial lemniscal system and anterolateral system	Nice to know (C)	SDL	MCQs
6.	Introduction to autonomic nervous system Basic Characteristics of sympathetic & parasympathetic function	• Describe general organization of autonomic nervous system • Enumerate the functions of autonomic nervous system • Describe sympathetic and parasympathetic nervous system • Enumerate & explain their receptors, neurotransmitters & physiological	Must Know (A)/ Should know (B)	LGIS&SDL	MCQs

		effects Describe physiological anatomy & effects of adrenal medulla			
7.	Somatosensory cortex & lesions of Somatosensory cortex	- Explain cortical mapping & association cortex - Describe lesions of somatosensory areas - Summarize role of thalamus in somatic sensations - Interpret the importance of dermatomes	Must Know (A)/ Should know (B)	LGIS&SDL	MCQs
8.	Excitatory & inhibitory effects of sympathetic & parasympathetic stimulation	- Briefly explain physiological actions of ANS, vasomotor tone, vagal tone & sympathetic stress response - Draw a table showing autonomic effects on various body organs - Briefly describe the pharmacology of autonomic nervous system	Must Know (A)/ Should know (B)	LGIS&SDL	MCQs
9.	CSF, Blood brain barrier, Blood CSF Barrier, Lumbar puncture	- Describe briefly the physiological anatomy of cerebral blood flow - Explain cerebrospinal fluids system - Describe the CSF pressure, its measurement by lumbar puncture, & hydrocephalus - Explain blood CSF barrier & BBB - Describe brain edema	Nice to know (C)	SDL	MCQs
10.	Concept of Association areas, Concept of Dominant and non-dominant cerebral	- Draw association areas of brain - Describe association areas of brain regarding	Must Know (A)/ Should know (B)	LGIS&SDL	MCQs

	hemispheres	their physiological role • Explain briefly the clinical features, if the association areas become damaged • Describe concept of dominant hemisphere • Enlist role of parieto-occipito temporal cortex in non-dominant hemisphere			
11.	Limbic system, Functions of hypothalamus	• Describe the concept of limbic system • Describe physiological anatomy of limbic system • Enumerate and explain the roles of hippocampus, amygdale and limbic cortex • Describe physiological anatomy of hypothalamus • Enlist functions of hypothalamus • Explain role of hypothalamus in: • Vegetative function • Endocrine function • Behavioral function • Reward and punishment function	Nice to know (C)	SDL	MCQs
12.	Speech and aphasia	• Describe sensory and motor aspects of communication • Define Wernicke's aphasia, Motor aphasia & Global aphasia • Explain Wernicke's aphasia, Motor aphasia & Global aphasia • Describe function	Must Know (A)/ Should know (B)	LGIS&SDL	MCQs

		of corpus callosum & anterior commissure in transferring information between two cerebral hemispheres			
13.	Learning and memory	• Define memory & classify its various types • Describe role of synaptic inhibition and synaptic facilitation in memory • Explain mechanism of short term, intermediate and long-term memory • Describe mechanism of consolidation of memory • Enumerate specific parts of brain involved in memory • Explain the role of each part	Should know (B)	LGIS&SDL	MCQs
14.	Reticular activating system and sleep	• Describe activating driving system of the brain • Explain the reticular activating system • Discuss the control of cerebral activity by signals from brain stem • Explain neurohormonal system of the brain • Define sleep and enumerate types of sleep • Compare and contrast between two types of sleep • Describe the basic theories of sleep in detail • Explain physiological	Nice to know (C)	SDL	MCQs

		effects of sleep Describe sleep and wakefulness cycle			
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5. **Special Senses:**

Sr. #	Topics	Learning Objectives	Calgary Model	Mode of Assessment	Tool of Assessment
1.	Introduction to Physiology of Eye & Optics of vision. General Principles of optics, Physiological basis for errors of refraction	- Explain the basic physiology of eye and its refractive surfaces - Discuss the physical principles of optics - Describe the mechanism of accommodation and its control - Describe the errors of refraction (Myopia, hyperopia, astigmatism and their correction by using different lens systems	Must Know (A)/ Should know (B)	LGIS &SDL	MCQs
2.	Introduction to Physiology of external ear, Middle ear	- Describe physiology of external ear - Describe physiology of middle ear - Explain structure of middle ear	Nice to know (C)	SDL	MCQs
3.	Fluid system of the eye Intraocular pressure, Function of the Structural Elements of the Retina	- Describe the formation and circulation of aqueous humor - Explain the mechanism of regulation of intraocular pressure - Define glaucoma and its treatment	Must Know (A)/ Should know (B)	LGIS&SDL	MCQs
4.	Functions of Inner ear, Physiology of Hearing	- Describe the physiology of hearing and function of tympanic membrane and ossicular system. - Define impedance matching and	Must Know (A)/ Should know (B)	LGIS&SDL	MCQs

		attenuation reflex • Explain the conduction of sound waves in the cochlea			
5.	Photochemistry of vision & Physiological basis for photo transduction	• Describe the physiology of retinal layers • Explain photochemistry of vision (rhodopsin - retinal) • Describe the mechanism of activation of Rods • Explain the photochemistry of color vision	Must Know (A)/ Should know (B)	LGIS& SDL	MCQs
6.	Hearing abnormalities, Tuning fork tests and audiometry	• Explain the auditory nervous pathway and abnormalities associated with it. • Describe the function of cerebral cortex in hearing.	Must Know (A)/ Should know (B)	LGIS& SDL	MCQs
7.	Light & dark adaptation, Color vision, Neural functions of the retina, Central neurophysiology of vision, Neural pathways for analysis of visual information	• Explain the neural circuitry of the Retina • Describe the physiology of visual pathway • Name the optic lesion associated with visual pathway	Must Know (A)/ Should know (B)	LGIS& SDL	MCQs
8.	Vestibular system	• Describe the function of the organ of corti • Explain vestibular system	Nice to know (C)	SDL	MCQs

6. Endocrinology Module:

Sr. #	Topics	Learning Objectives	Calgary Model	Mode of Assessment	Tool of Assessment
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1.	Hypothalamic-pituitary axis & GH	- Recall the physiological anatomy and parts of pituitary gland - Enumerate various cell types in pituitary gland along with their secretion and function - Explain connections of anterior and posterior pituitary gland with hypothalamus - Enlist various hormones secreted from anterior & posterior pituitary gland - Describe metabolic functions of growth hormone - Elaborate the role of growth hormone in soft tissue and bone growth - Discuss role of somatomedins in relation with growth hormone - Explain regulation of secretion	Must Know (A)/ Should know (B)	LGIS &SDL	MCQs
2.	Introduction to Endocrinology & Signal transduction	- Classify hormones according to solubility and chemical nature - Describe the nature & synthesis of hormones - Differentiate different classes of hormones - Describe the secretion, transport, feedback control & clearance of hormones - Differentiate different classes of hormones	Nice to know (C)	SDL	MCQs
3.	Insulin and glucagon:	Describe physiological anatomy of pancreas	Must Know (A)/	LGIS &S DL	MCQs

		- Describe chemistry, synthesis and transport of insulin - Describe the factors which affect secretion of insulin - Discuss mechanism of action of insulin - Describe the physiological actions of insulin - Explain mechanism of insulin secretion - Describe mechanism of action of glucagon - Discuss regulation of secretion of glucagon - Explain the functions of glucagon	Should know (B)		
4.	Aldosterone and cortisol	- Describe physiological anatomy of adrenal gland - Enumerate its various hormones - Describe synthesis, transport & metabolism of adrenocortical hormones - Describe mechanism, physiological actions of aldosterone - Explain the phenomenon of aldosterone escape - Describe regulation of aldosterone secretion - Enlist abnormalities of aldosterone secretion - Describe mechanism, physiological actions of cortisol - Discuss anti stress and anti-	Must Know (A)/ Should know (B)	LGIS& SDL	MCQs

		inflammatory actions of cortisol - Describe regulation of cortisol secretion - Discuss functions of adrenal androgens - Describe the chemistry, secretion regulation of secretion of ACTH - Discuss the actions of ACTH			
5.	Thyroid hormone:	- Recall physiological anatomy of thyroid gland - Briefly explain secretions of thyroid gland - Compare the features of tri iodothyronine with thyroxine - Describe the steps of synthesis of thyroid hormone - Discuss in detail half-life, release, and transport of thyroid hormones - Explain regulation of secretion of thyroid hormone	Must Know (A)/ Should know (B)	LGIS& SDL	MCQs
6.	Abnormalities of thyroid hormone (Goiter, hypothyroidism and hyperthyroidism)	- Enlist disorders of thyroid gland - Discuss in detail causes, symptoms, diagnosis and treatment of hyperthyroidism - Discuss in detail causes, symptoms, diagnosis and treatment of hypothyroidism - Compare hypothyroidism with hyperthyroidism - Differentiate between pituitary dwarfism and cretinism	Should know (B)	LGIS& SDL	MCQs

7.	Calcium homeostasis (Vitamin D, parathyroid hormone and calcitonin)	• Discuss normal levels and metabolism of calcium and phosphate • Describe the effects of hypocalcemia & hypercalcemia • Explain the absorption and excretion of calcium and phosphate • Discuss in detail bone physiology • Describe the steps involved the activation of Vitamin D • Discuss the actions of vitamin D • Describe the physiological anatomy of parathyroid glands • Describe the chemistry & regulation of secretion of parathyroid hormone • Explain the actions of parathyroid hormones • Describe functions and regulation of calcitonin	Nice to know (C)	SDL	MCQs
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